"External, Internal, and Nondual Space"

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In this paper I shall first give a scientific account of the nature of the external space of the physical universe, drawing out the distinctions between the relative, or false, vacuum and the absolute, or true, vacuum. Next I will present a Buddhist account of the nature of the internal space of the mind, focusing on the relative vacuum state of consciousness, followed by an examination of nondual space, in which the demarcations between outer and inner and between space and consciousness dissolve. Finally, I shall discuss the parallels and differences between these theories of space and examine the ways in which these paradigms may enrich each other theoretically and experimentally.

The External Space of the Physical Universe

From the time of Greek antiquity natural philosophers had commonly assumed that Nature abhors a vacuum, so such a state of empty space was an impossibility. Many other assumptions were made about the nature of material bodies within space, which, from the time of ancient Greece had been defined as regions of space endowed with properties, the most characteristic of which are impenetrability and mass. These claims were called into question with the development of sophisticated means of observation and experimentation by such natural philosophers as Galileo (1564-1642). By refining the telescope and

carefully examining the heavens, he empirically overturned centuries-old assumptions, and in so doing he initiated a Galilean Revolution pertaining to material bodies in space.

Galileo's student Evangelista Torricelli (1608-1647), an Italian mathematician and physicist, started another, lesser-known revolution by being the first to create a relative vacuum by removing all material bodies from a container within the limits of the technology of his time. This "Torricellian Revolution" demonstrated that Nature's abhorrence of the vacuum could be at least relatively overcome by means of human ingenuity. And in the following centuries, there has been no lack of genius in creating an unexpectedly vast array of technological innovations that have made use of vacuums, including thermometers, thermos bottles, all forms of refrigeration, TV picture tubes, X-ray tubes, electron microscopes, and particle accelerators.

What Torricelli and later generations of physicists created in this regard have been relative, or false vacuum states of space. Such a vacuum is defined as the lowest possible energy state of a volume of space, the state you get when you take everything else away, *within the current limits of technology*. Such a vacuum is only relative, for it is not completely devoid of energy or internal structure. In contemporary physics the relation between space and material bodies remains very close. Configurations of mass-energy are viewed as excitations of the vacuum, much as surface waves in a pond are excitations of the pond's water. Light, for instance, is regarded as a kind of excitation of empty space, or more accurately, as an oscillation of abstract field quantities in space, not an oscillation of space proper. Light waves do not really consist of oscillations of material bodies; their oscillations are of an abstract nature, for nothing actually oscillates. The vacuum in itself is shapeless, but it may assume specific shapes, and in doing so, it takes on the appearance of a physical reality, a "real world." In

modern quantum mechanics, material bodies have hardly any status other than that of large-scale localized appearances emerging from a web of non-local correlations. As abstract as such bodies appear to be, according to relativity theory, these fluctuating masses of the vacuum interact with each other and even cause curvatures of space. But no one knows just how such interactions take place.

This current view of physical phenomena consisting of nothing more than excitations of empty space, or—even less tangibly—as oscillations of abstract quantities, recasts the mechanistic question of how substantial bodies of matter can possibly interact with insubstantial minds. There is something antiquated about materialists approaching the mind/body problem as if we still dwelled in the era of classical mechanics. Consider Steven Weinberg's recent comment, "In the physicist's recipe for the world, the list of ingredients no longer includes particles. Matter thus loses its central role in physics. All that is left are principles of symmetry."[1] In light of this assertion by a contemporary Nobel Laureate in physics, what is it exactly that materialists believe in? Shall we, echoing the Nietzsche's proclamation that "God is dead" proclaim that matter is both dead and gone? What then are materialists to believe in?

While physicists have made great progress in understanding, creating, and utilizing *relative* vacuum states of physical space, when it comes to the absolute, or true, vacuum, it's another matter. A true vacuum is defined as whatever remains once we have removed from some well-defined space everything that the laws of nature permit us to take away. But scientists do not know *all* the laws of nature, so it is difficult for them to conceptualize the true vacuum, let alone create one. Such a region of space is as empty of material bodies and of energy as Nature allows. Having no internal structure, it is perfectly symmetrical, timeless,

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[1]Quoted in K. C. Cole, "In Patterns, Not Particles, Physicists Trust" in *Los Angeles Times*, March 4, 1999.

featureless empty space, in which nothing changes, and everything would be the same. Since it is changeless, it is imperceptible to the instruments of technology, and nothing that scientists could do to it would make any difference to it.

This true vacuum is sometimes called the "melted vacuum," in which quarks, electrons, gravity, and electricity are the same, whereas in the false, or "frozen," vacuum they're different. The assertion that the true vacuum entails the lowest possible energy state of a volume of space might suggest that it is utterly devoid of energy. But on the contrary, according to quantum electrodynamics, the true vacuum at zero temperature has an *infinite* supply of radiation energy. In the view of many contemporary physicists, the energy intrinsic to empty space has a great relevance to the Big Bang and the formation of the cosmos. In their view, the universe began as a perfectly symmetrical nothing, but with the Big Bang enormous amounts of energy of the vacuum were released, which accounts for the tremendous heat in the early stages of cosmic evolution. Like water freezing into ice, the inflated vacuum froze into the structure that gave rise to quarks, electrons, light, and eventually living organisms.[2] According to physicist Henning Genz, "Maybe quantum mechanical fluctuations initiated not only the *stuff* of our world was made of prior to inflation but also space-time itself. Maybe the true *vacuum*, the true *nothing*, of philosophy and religion should be seen as a state wholly innocent of laws, space, and time. This state can be thought of as nothing but a collection of possibilities of what might be."[3]

The Internal Space of the Mind

Torricelli's use of new technology overthrew the ancient assumption among natural philosophers that a physical vacuum was impossible. Nowadays

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[2] K. C. Cole (2001). *The Hole in the Universe: How Scientists Peered over the Edge of Emptiness and Found Everything*. New York: Harcourt, Inc., pp. 177-8.
[3] Henning Genz (1999) *Nothingness: The Science of Empty Space*. Karin Heusch, trans. Cambridge, Mass.: Perseus Books, p. 312.

cognitive scientists widely assume that it is impossible for the conscious mind to be empty of concepts and conceptual structuring. In other words, Nature abhors a mental vacuum. Does this conclusion constitute a profound insight into the fundamental nature of consciousness, or does it simply reflect a narrow view of the range of possible mental states? To explore this question, we may begin by pointing out that contemporary philosophers of mind, psychologists, and cognitive neuroscientists base their conclusions principally on the experiences of normal and subnormal individuals (those suffering from mental disease or brain damage). Of course, there are numerous studies of musicians, mathematicians, artists, and others with exceptional mental abilities, but little scientific research has been done in collaboration with contemplatives who have experientially explored states of non-conceptual awareness.

The history of contemplative investigation into the nature of consciousness spans millennia. In the sixth-century B.C.E., under the guidance of his teachers Arada Kalama and Udraka Ramaputra, Siddhartha Gautama claimed to have achieved extremely stable, vivid states of meditative concentration (*samadhi*), in which the mind is freed of even very subtle contents, such as thoughts, imagery, and emotions conditioned by one's society and personal history. In short, he used the contemplative "technology" of his day to explore vacuum states of consciousness. Subsequently, he applied these advanced states of *samadhi* to the penetrating investigation of the mind and its relation to the natural world. While the scientific revolution of Galileo and Torricelli turned to external space and its material contents, Gautama turned to internal space and its mental contents. The alleged range of uses of the vacuum states of consciousness induced by the cultivation of *samadhi* are, in their own ways, no less remarkable than the range of uses of the physical vacuum. They include various types of paranormal abilities and extrasensory perception

including mental emanation, clairvoyance, clairaudience, recollection of past lives, and knowing others' minds. But most importantly, the utilization of non-conceptual states of awareness can reportedly lead to the complete healing of the mind of all kinds of internal imbalances and their resultant suffering.

Buddhist contemplative theory identifies two types of vacuum states of consciousness, relative and absolute. One Buddhist term for the relative mental vacuum is the *bhavanga*, or *individual ground of becoming*. Dynamic mental processes, such as sensory perceptions, discursive thoughts, mental images, and desires are called *javana*; and the *bhavanga* is the resting, ground state of consciousness from which all such "kinetic energy" of the mind emerges.[4] Described as the natural, unencumbered state of the mind, its innate radiance and purity are present even when the mind is obscured by afflictive thoughts and emotions. This ground state of individual human consciousness entails the lowest possible kinetic energy state of *javana*, but the highest potential energy state, with the greatest number of possibilities. Like the physical vacuum, it is shapeless, but it can manifest in all kinds of mental forms and images, and in doing so, it takes on the appearance of a "real mind."

According to the Madhyamaka, or "Middle Way," view, widely regarded as the pinnacle of Buddhist philosophy, both physical and mental phenomena have no ontological status other than that of localized appearances emerging from a web of non-local correlations. In other words, they all exist as dependently related events (*pratityasamutpanna*), not as autonomous, inherently existent, localized entities. The fluctuating processes of the mind interact with each other and with the body, and they can even cause a kind of warping of the space of the mind. But no mechanism has been identified that explains how such interactions take place. One possible conclusion is that such interactions cannot

[4] See Peter Harvey (1995) *The Selfless Mind: Personality, Consciousness and Nirvana in Early Buddhism*. Surrey: Curzon Press.

be understood in terms of a mechanistic framework, only a phenomenological one.

Generally speaking, the *bhavanga* is indiscernible while the mind is active, for it normally manifests only in dreamless sleep and during the very last moment of a person's life. To unlock this natural purity and luminosity of consciousness so that its radiant potential is revealed, one must calm the involuntary activity of the mind through the cultivation of *samadhi*, specifically the practice of meditative quiescence.[5] In this way, one can see through the superficial turbulence of the mind into its limpid depths. I have called the *bhavanga* a relative, or false, vacuum state of consciousness, because, while it is voided of all the mental contents—i.e., those pertaining to personal history, cultural influences, gender, language, concepts, and species—precognitive, unconscious structuring of awareness persists. Thus, the *bhavanga* is the relative vacuum state you get when you take everything away from the space of the mind by cultivating meditative quiescence.

Nondual Space

For centuries, natural scientists focused externally on objective, physical phenomena, while ignoring the existence and role of consciousness in nature. Since they have no scientific definition of consciousness and no technological means of detecting its presence or influence in the natural world, they have in effect excluded the subjective mind from their scientific worldview. At most, it is regarded as an *emergent property* of configurations of mass-energy in the brain, which scientists *have* explored; or mental processes are interpreted as being, in some as-yet-unexplained way, *identical* to brain processes. Buddhist

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[5] See B. Alan Wallace (1999) "The Buddhist Tradition of *Samatha*: Methods for Refining and Examining Consciousness." *Journal of Consciousness Studies*, **6**, No. 2-3, 1999. pp. 175-187; (1998) *The Bridge of Quiescence: Experiencing Tibetan Buddhist Meditation*. Chicago: Open Court.

contemplatives, on the other hand, while resting in the *bhavanga*, have withdrawn their attention from physical space and material bodies, so as long as they remain in that state of *samadhi*, they are in no position to explore the relation between the internal space of the mind and the external space of the physical world.

The absolute, or true vacuum state of consciousness, in which the contrived duality of physical space and mental space is dissolved, has been explored theoretically and experientially with great clarity and depth in the Great Perfection (Dzogchen) school of Tibetan Buddhism. According to this contemplative tradition, the nonduality of external and internal space is called the *dharmadhatu*, or absolute space of phenomena. Out of this space emerge all the phenomena that make up our intersubjective experienced world, including external and internal space, time, matter, and consciousness. All phenomena consist of nothing other than configurations of this absolute space.

The mode of awareness with which one ascertains this absolute space is called *primordial consciousness* (*jñana*), which is the ultimate nature of all individual continua of consciousness. The experiential realization of absolute space by primordial consciousness is said to transcend all distinctions of subject and object, mind and matter, indeed, all words and concepts. Such insight does not entail the meeting of a subjective mode of consciousness with an objective space, but rather the nondual realization of the innate unity of absolute space and primordial consciousness. This unity is the Great Perfection, often referred to as the "one taste" of all phenomena and the "purity and equality" of absolute space and all the phenomena that emerge from it.

While the *bhavanga* has an internal structure and is bound by time and causality, the unity of absolute space and primordial consciousness is the absolute, or true, vacuum, devoid of all internal structure. In the "false vacuum"

of the *bhavanga*, contemplatives reportedly experience bliss, luminosity, and nonconceptuality as distinct aspects of consciousness. But in the "real vacuum" of primordial consciousness, there is no differentiation among these experiences, or of subject and object, indicating a perfect symmetry that transcends relative space, time, mind, and matter. The *bhavanga* has been characterized as the ground state of the human mind, out of which emerges all mental activity of a single individual. Primordial consciousness, on the other hand, is of the same nature as the ground state of absolute space, out of which emerge all mental and physical phenomena in the universe.

The Dalai Lama comments on the significance of this state of consciousness for the human mind and its relation to the natural world, "Any given state of consciousness is permeated by the clear light of primordial awareness. However solid ice may be, it never loses its true nature, which is water. In the same way, even very obvious concepts are such that their 'place', as it were, their final resting place, does not fall outside the expanse of primordial awareness. They arise within the expanse of primordial awareness and that is where they dissolve."[6] While the relative vacuum of the *bhavanga* can be ascertained by means of the cultivation of meditative quiescence, the absolute vacuum of the *dharmadhatu* can be realized only through the cultivation of contemplative insight (*vipashyana*). Such experiential insight is gained by first investigating the origins, location, and manner of dissolution of all types of phenomena, breaking down all reified divisions of "outer" and "inner," then resting in a state of luminous nonduality.[7]

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[6] H. H. the Dalai Lama (2000) *Dzogchen: The Heart Essence of the Great Perfection.* Translated by Geshe Thupten Jinpa & Richard Barron. Ithaca, NY: Snow Lion Publications, pp. 48-9.

[7] Karma Chagmé 1998) *A Spacious Path to Freedom: Practical Instructions on the Union of Mahāmudrā and Atiyoga*, Karma Chagmé, with commentary by Gyatrul Rinpoche. Translated by B. Alan Wallace. Ithaca, NY: Snow Lion Publications, Chapters 4 & 5.

When scientists observe physical space and its material contents, the perceptual images that they experience arise in the space of consciousness, not some objective space existing independently of consciousness. As neurologist Antonio Damasio points out, “There is no picture of the object being transferred from the object to the retina and from the retina to the brain.”[8] Likewise, when they devise mathematical laws and theories to describe nature, those concepts arise in the space of consciousness and nowhere else. Physicists have imagined a universe devoid of consciousness, but the only universe of which they have any knowledge is one imbued with consciousness. In other words, the external space envisioned by physicists is as devoid of real, subjective experience as the world of experience is devoid of real, objective space. Each one is out of touch with the other, which raises the question: which one, if either, real?

Physicists’ descriptions of the relative and absolute vacuum states of external space bear striking resemblances to the relative and absolute vacuum states of consciousness described by Buddhist contemplatives. One striking difference, however, is that the absolute vacuum as conceived by physicists is devoid of consciousness, while the absolute vacuum conceived by Buddhists is of the same nature as non-local, atemporal, primordial consciousness. Physicist John March-Russell comments, “The current belief is that you have to understand all the properties of the vacuum before you can understand anything else.”[9] If one of the properties of the vacuum is consciousness; and if it turns out that the mind fundamentally emerges not from matter but from a dimension of reality that transcends the duality of mind and matter; then understanding the mind becomes crucial to understanding the rest of the universe, from which it has so long been excluded in the scientific view of nature.

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[8] Antonio Damasio (1999) *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. New York: Harcourt, Inc., p. 321.
[9] Cited in K. C. Cole (2001) p. 235.